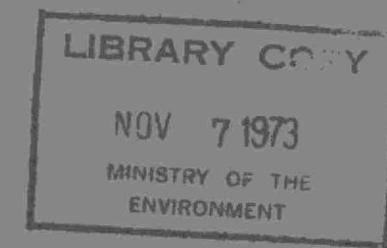


NEWMARKET

OPERATING SUMMARY



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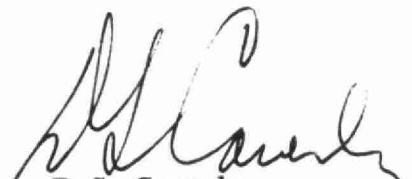
Ministry of the
Environment

135 St. Clair Avenue West
Toronto 195, Ontario

We are pleased to present you with the 1972 operating summary for the water pollution control plant serving your community.

This summary contains data on the performance of the plant as well as relevant financial information. Of particular interest is the review of the year's activities in which significant items of these data are discussed in some detail by the operations engineer and his staff who, by their day-to-day involvement with the operation, are thoroughly familiar with the plant.

We appreciate your continuing interest in protecting the environment through the efficient operation of this wastewater treatment facility.



D. S. Caverly,
Assistant Deputy Minister.



D. A. McTavish, P. Eng.,
Director,
Project Operations Branch.

MINISTRY OF THE ENVIRONMENT

MINISTER
Honourable James A.C. Auld

DEPUTY MINISTER
E. Biggs

ASSISTANT DEPUTY MINISTER
D.S. Caverly

EXECUTIVE DIRECTOR
K. H. Sharpe

PROJECT OPERATIONS BRANCH

DIRECTOR
D.A. McTavish

ASSISTANT DIRECTOR
C.W. Perry

REGIONAL SUPERVISOR
P.J. Osmond

OPERATIONS ENGINEER
A. Clark

135 St. Clair Avenue West
Toronto 195

NEWMARKET

WATER POLLUTION CONTROL PLANT

operated for

THE TOWN OF NEWMARKET

by the

MINISTRY OF THE ENVIRONMENT

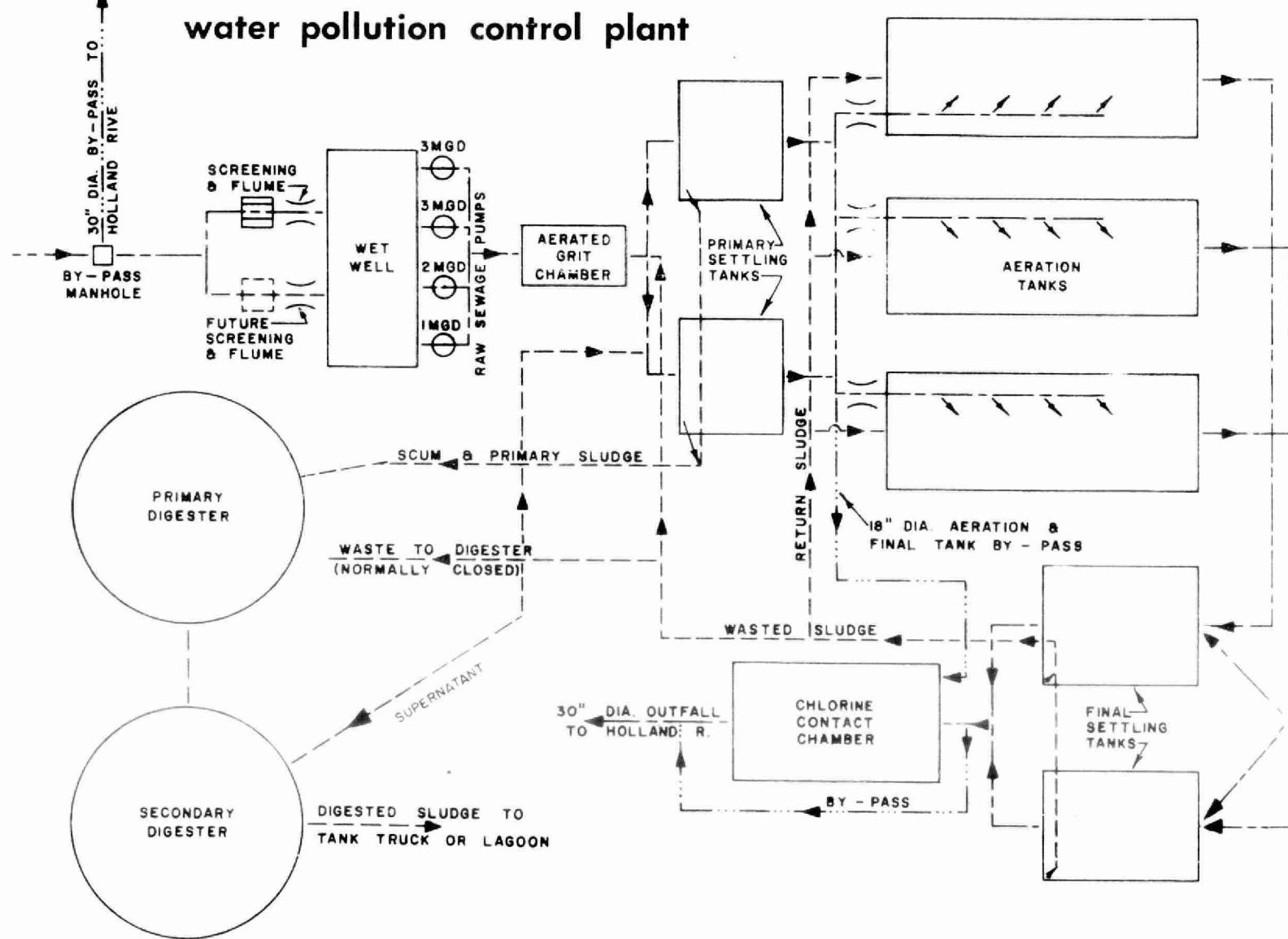
1972 ANNUAL OPERATING SUMMARY

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NEWMARKET-EAST GWILLIMBURY

water pollution control plant



DESIGN DATA

PROJECT NO.	2-0087-61
TREATMENT	Activated Sludge
DESIGN FLOW	2.0 mgd
DESIGN POPULATION	
Newmarket	9,200
East Gwillimbury	10,000
BOD - Raw Sewage	220 mg/l
- Removal	90%
SS - Raw Sewage	212 mg/l
- Removal	90%

PRIMARY TREATMENT

Screening

in East Channel; 1" spacing

Raw Sewage Pumps

Type: Smart Turner

Size: Two 1875 gpm @ 30' tdh
One 1560 gpm @ 30' tdh
One 1000 gpm @ 30' tdh

Grit Removal

Type: Aerated, grit removed by air lift

Size: Two 14.3' x 6' x 8.1' swd
(9,700 gal)

Retention: 7 min

Air Supply: One Sutorbilt
130 scfm @ 8 psi

Primary Sedimentation

Type: Eimco
Size: Two 30' x 30' x 11.7' swd
(131,000 gal)
Retention: 1.57 hr
Loading: Surface, 1110 gal/ft²/day
Weir, 10,800 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical; single-pass
Size: Three 90' x 30' x 10.7'
(107,500 cu ft or 0.67 mil gal)

Aerators

Twelve Simcar

Secondary Sedimentation

Type: Eimco
Size: Two 35' x 35' x 13' swd
(197,000 gal)
Retention: 2.4 hr
Loading: Surface, 840 gal/ft²/day
Weir, 7,870 gal/ft/day

CHLORINATION

Wallace & Tiernan

Chlorine Contact Chamber

Size: One 61.4' x 9' x 10.1'
(34,800 gal)
Retention: 25 min

OUTFALL

to Holland River

SLUDGE HANDLING

Digestion System - Two Stage

Primary --

Type: Gas mixed concrete
C. P. Lammert gas comp.
Size: One 40 dia x 21.25 swd
(26,800 cu ft or 0.167 mil gal)
Loading: 2.9 lb/cu ft/mo

Secondary --

Size: One 40; dia x 23' swd
(28,950 cu ft or 0.18 mil gal)
Total Loading: 1.4 lb/cu ft/mo

'72 Review

GENERAL

This project consists of a 2.0 mgd plant with an aerated grit chamber, two primary sedimentation tanks, three single pass aeration tanks, two final sedimentation tanks, a chlorine contact chamber and a two stage digestion system. A phosphorus treatment process utilizing lime was established as a permanent addition to the plant during the year for phosphorus reduction in the final effluent.

Four aerator drive mechanisms were replaced during the year. The replacement mechanisms will keep maintenance costs to a minimum. It is intended to replace the remaining eight mechanisms over a two year period.

Throughout the year the Ministry of the Environment's Research Branch conducted various studies at this plant, relating to denitrification, effluent polishing and phosphorus removal. Results of these studies will be available in 1973.

PLANT FLOWS AND CHLORINATION

The total recorded flow to the plant during 1972 was 732 million gallons. The flow recorder was out of service for repairs during the months of August to November and the flows for these months were estimated. The average daily flow to the plant was 2.0 million gallons, 100 percent of the plant's hydraulic capacity.

The maximum recorded daily flow to the plant was 8.4 million gallons. Flows between 2.0 million gallons per day and 5.0 million gallons per day received primary treatment only. Flows greater than 5.0 million gallons per day were by-passed entirely.

The plant effluent was chlorinated from May 1st to October 31st. A total of 15,100 pounds of chlorine was used at an average dosage of 5.0 mg/l to maintain an 0.5 mg/l residual in the effluent.

PLANT EFFICIENCY

The average influent BOD and suspended solids were 185 mg/l and 552 mg/l respectively. The average effluent BOD and suspended solids were each 15 mg/l. These figures represent an average reduction of 92 percent and 97 percent respectively. The reductions of BOD and suspended solids are similar to the results of 1971.

The average influent and effluent phosphorus were 7.5 mg/l and 1.9 mg/l respectively. These figures represent approximately 75 percent phosphorus removal. However the recorded influent phosphorus was only 2.7 mg/l in September. If this reading was disregarded, the average removal would be approximately 87 percent. Even with this degree of removal, it is apparent that the lime treatment cannot maintain a 1.0 mg/l content in the plants effluent.

A total of 1148 cubic feet of grit was removed during the year. This figure represents an average removal of 15.7 cubic feet of grit per million gallons of sewage received at the plant.

SLUDGE DIGESTION AND DISPOSAL

A total of 3,400,000 gallons of raw sludge was pumped to the digester during the year. Although this sludge was treated with lime, a normal digester operation was maintained. A total of 3,349,365 gallons of digested sludge was hauled by tank truck for land disposal during the year.

CONCLUSIONS

The average daily flow to the plant has reached the plant's hydraulic design capacity. Approximately 31 percent of the time, the average flows to the plant exceed the design capacity. Unless the plant is expanded, the process efficiency will fall to unsatisfactory levels.

PROJECT COSTS

2-0086-61 (Newmarket)	
NET CAPITAL COST	\$188,608.82
DEDUCT - Portion financed by	
CMHC (Final)	(74,515.33)
MUNICIPAL ADVANCES	<u>(114,093.49)</u>
Long Term Debt to MOE	\$ <u> -</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1972	\$ <u> 503.22</u>
Net Operating	\$ 7,757.91
Debt Retirement	-
Reserve	-
Interest Charged	-
TOTAL	\$ <u>7,757.91</u>

RESERVE ACCOUNT

Balance @ January 1, 1972	\$ 9,304.35
Deposited by Municipality	-
Interest Earned	<u>610.20</u>
	\$ 9,914.55
Less Expenditures	<u>-</u>
Balance @ December 31, 1972	\$ <u>9,914.55</u>

PROJECT COSTS

2-0087-61 - STAGE 1 and 3 A (Newmarket)	
NET CAPITAL COST	\$10,187.75
DEDUCT - Portion financed by	
CMHC (Final)	(5,233.80)
MUNICIPAL ADVANCES	<u>(1,966.44)</u>
Long Term Debt to MOE	\$ <u>2,987.51</u>
Debt Retirement Balance at Credit	
(Sinking Fund) December 31, 1972	\$ <u>712.71</u>
Net Operating	\$ -
Debt Retirement	20.00
Reserve	25.60
Interest Charged	<u>167.53</u>
TOTAL	\$ <u>213.13</u>

RESERVE ACCOUNT

Balance @ January 1, 1972	\$ 536.20
Deposited by Municipality	25.60
Interest Earned	<u>35.05</u>
	\$ 596.85
Less Expenditures	<u>-</u>
Balance @ December 31, 1972	\$ <u>596.85</u>

PROJECT COSTS

2-0087-61 - STAGE 1 and 3B (Newmarket)	
NET CAPITAL COST	\$114, 053. 15
DEDUCT - Portion financed by CMHC (Final)	(58, 593. 01)
MUNICIPAL ADVANCES	<u>(22, 014. 50)</u>
Long Term Debt to MOE	\$ <u>33, 445. 64</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1972	\$ <u>7, 975. 90</u>
Net Operating	\$
Debt Retirement	221. 00
Reserve	294. 45
Interest Charged	<u>1, 875. 60</u>
TOTAL	\$ <u>2, 391. 05</u>

RESERVE ACCOUNT

Balance @ January 1, 1972	\$ 6, 002. 79
Deposited by Municipality	294. 45
Interest Earned	<u>392. 32</u>
	\$ 6, 689. 56
Less Expenditures	<u>-</u>
Balance @ December 31, 1972	\$ <u>6, 689. 56</u>

PROJECT COSTS

2-0087-61 - STAGE 2 (Newmarket)	
NET CAPITAL COST	\$984, 794. 45
DEDUCT - Portion financed by CMHC (Final)	(449, 521. 34)
MUNICIPAL ADVANCES	<u>(374, 099. 63)</u>
Long Term Debt to MOE	<u>\$161, 173. 48</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1972	\$ <u>34, 346. 76</u>
Net Operating	\$ 52, 168. 19
Debt Retirement	1, 670. 00
Reserve	3, 778. 64
Interest Charged	<u>9, 038. 44</u>
TOTAL	\$ <u>66, 655. 27</u>

RESERVE ACCOUNT

Balance @ January 1, 1972	\$ 34, 206. 70
Deposited by Municipality	3, 778. 64
Interest Earned	<u>2, 196. 88</u>
	\$ 40, 182. 22
Less Expenditures	<u>5, 311. 90</u>
Balance @ December 31, 1972	\$ <u>34, 870. 32</u>

PROJECT COSTS

2-0087-61 - STAGE 1 and 3 A (E. Gwillimbury)
NET CAPITAL COST

DEDUCT - Portion financed by

Long Term Debt to MOE

Debt Retirement Balance at Credit
(Sinking Fund) December 31, 1972

Net Operating	
Debt Retirement	
Reserve	\$ 7.18
Interest Charged	
TOTAL	\$ <u>7.18</u>

RESERVE ACCOUNT

Balance @ January 1, 1972	\$133.36
Deposited by Municipality	7.18
Interest Earned	<u>8.80</u>
	\$149.34
Less Expenditures	<u>-</u>
Balance @ December 31, 1972	<u>\$149.34</u>

PROJECT COSTS

2-0087-61 - STAGE 1 and 3 B (E. Gwillimbury)
NET CAPITAL COST

DEDUCT - Portion financed by

Long Term Debt to MOE

Debt Retirement Balance at Credit
(Sinking Fund) December 31, 1972

Net Operating	
Debt Retirement	
Reserve	\$ 72.46
Interest Charged	
TOTAL	\$ <u>72.46</u>

RESERVE ACCOUNT

Balance @ January 1, 1972	\$1,493.01
Deposited by Municipality	72.46
Interest Earned	<u>97.54</u>
	\$1,663.01
Less Expenditures	<u>-</u>
Balance @ December 31, 1972	<u>\$1,663.01</u>

PROJECT COSTS

2-0087-61 - STAGE 2 (E. Gwillimbury)
NET CAPITAL COST

DEDUCT - Portion financed by

Long Term Debt to MOE

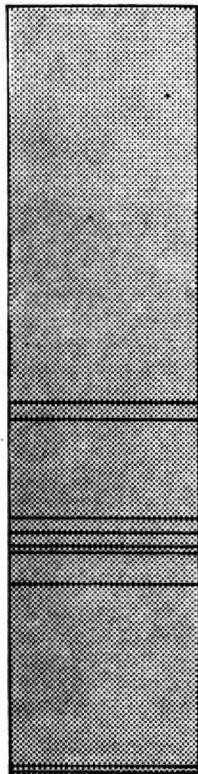
Debt Retirement Balance at Credit
(Sinking Fund) December 31, 1972

Net Operating	\$22, 357. 80
Debt Retirement	
Reserve	1, 621. 91
Interest Charged	<hr/>
TOTAL	<u>\$23, 979. 71</u>

RESERVE ACCOUNT

Balance @ January 1, 1972	\$15, 174. 66
Deposited by Municipality	1, 621. 91
Interest Earned	<hr/> 975. 44
	\$17, 772. 01
Less Expenditures	<u>2, 276. 53</u>
Balance @ December 31, 1972	<u>\$15, 495. 48</u>

OPERATING COSTS



1972 COSTS

TOTAL ANNUAL COST

NET OPERATING	81 %
DEBT RETIREMENT	2 %
RESERVE	6 %
INTEREST	11 %

YEARLY OPERATING COSTS

YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	TREATMENT COSTS	
			\$ per million gal	\$ per lb BOD
1968	531.39	46,889.60	88.24	5 cents
1969	612.10	56,909.54	93.00	5 cents
1970	578.3	61,387.83	106.15	7 cents
1971	633.	77,197.97	121.94	7 cents
1972	732.0 *	81,776.52	112.00	6 cents

* Estimated

MONTHLY OPERATING COSTS

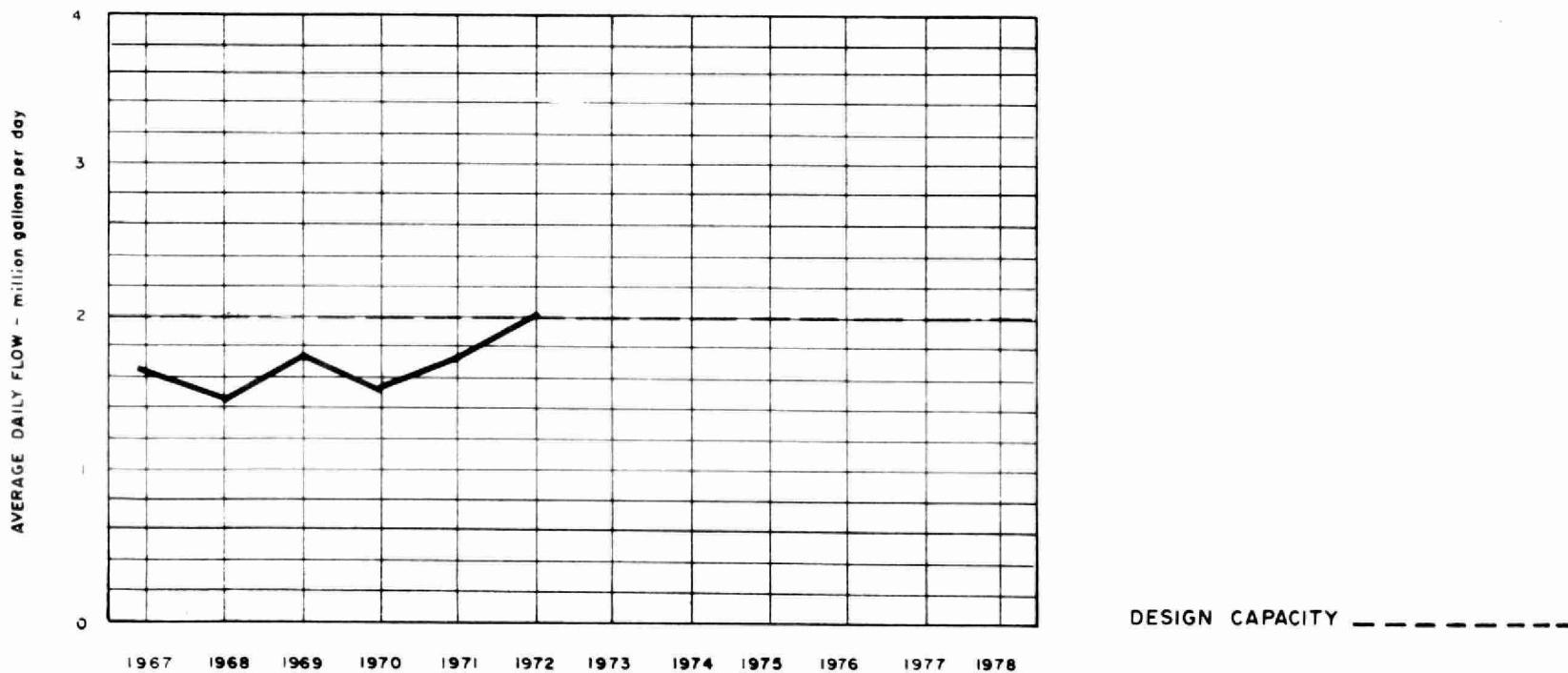
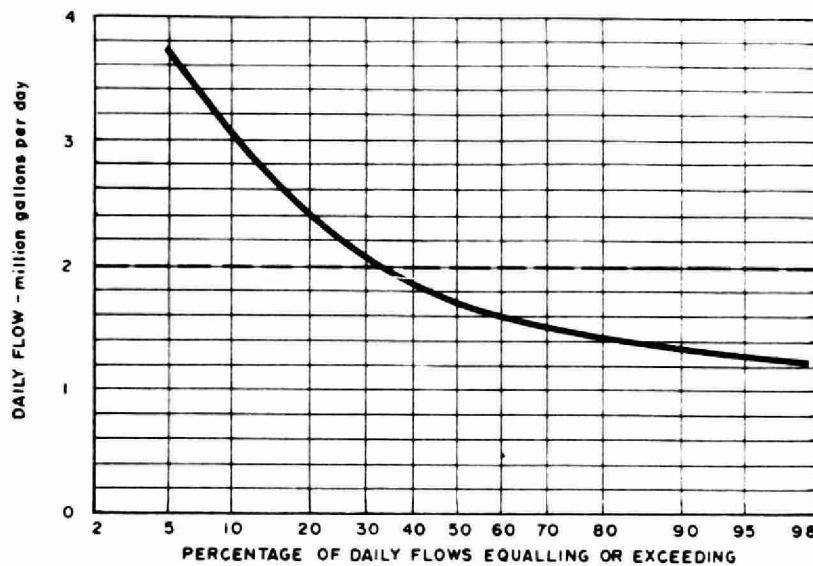
MONTH	TOTAL EXPENDITURE	REGULAR PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY*	WATER	TRAVEL
JAN	3624.36	2702.94		906.27								15.15
FEB	4458.91	2834.22		137.63	902.18		78.97		492.54	(2.98)		16.35
MAR	4536.62	2898.47		138.00	816.11		28.80	69.30	268.50	298.09		19.35
APR	5821.34	3104.85		137.60	951.92		208.80		78.57	1339.60		
MAY	5489.41	2995.33		439.05	964.52		101.95			938.01		50.55
JUNE	7464.18	4135.04		295.96	985.13		318.76	124.91	286.54	1317.84		
JULY	1896.41	63.37				549.00	63.36		154.06	1026.42		40.20
AUG	6065.06	2874.24			2069.16	485.03	81.26		521.62	(2.06)	12.41	23.40
SEPT	9664.29	2974.51	686.05	160.72			86.90		575.50	5180.61		
OCT	7525.02	3487.33	275.72	137.61	922.33	501.75	140.75			2034.63		24.90
NOV	6543.68	39.25			666.83		47.55	(175.00)	196.65	5662.36	14.91	91.10
DEC	18687.24	12156.02	424.51		1268.67	501.75	277.26	507.00	985.28	2468.80	11.40	86.55
TOTAL	81776.52	40265.57	1386.28	1446.57	10453.12	2037.53	1434.36	526.21	3559.29	20261.32	38.72	367.55

Brackets indicate credit.

* Sundry includes sludge haulage costs of \$15,855.28

PROCESS DATA

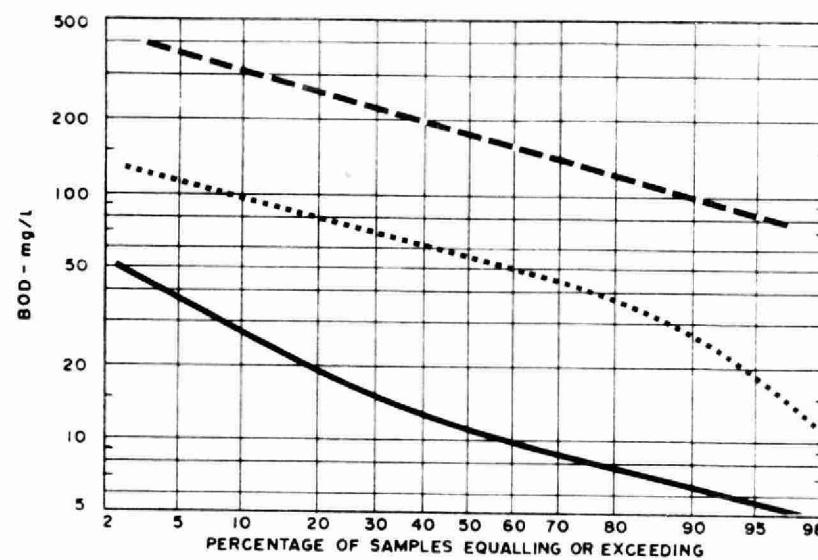
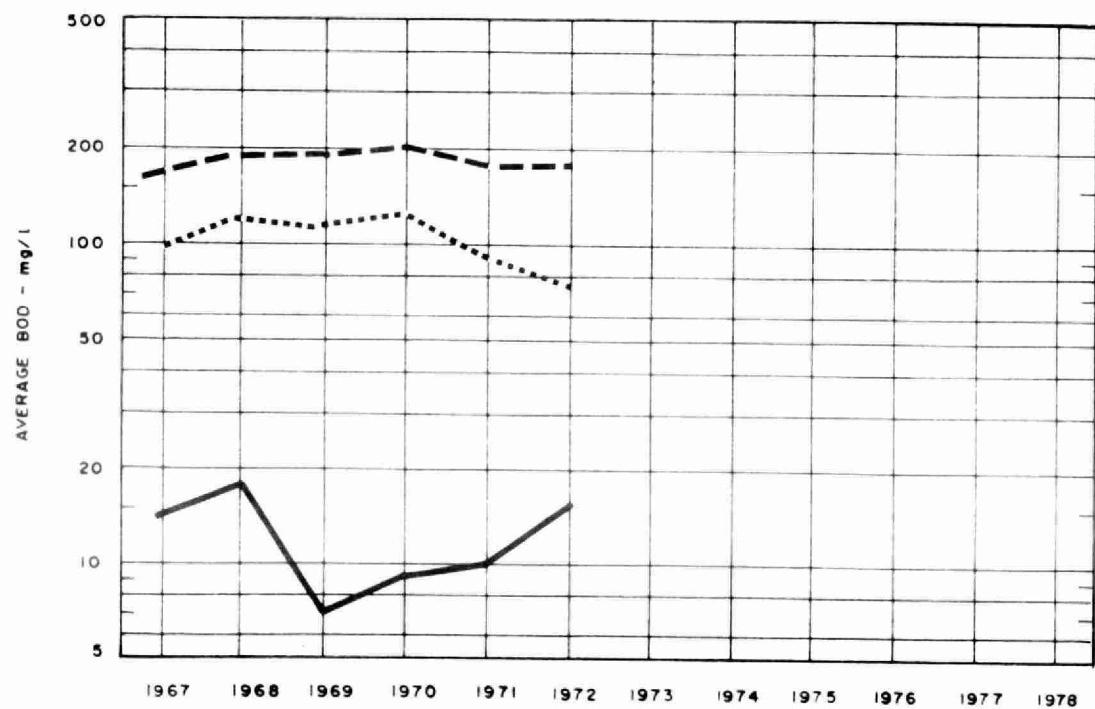
FLOWS



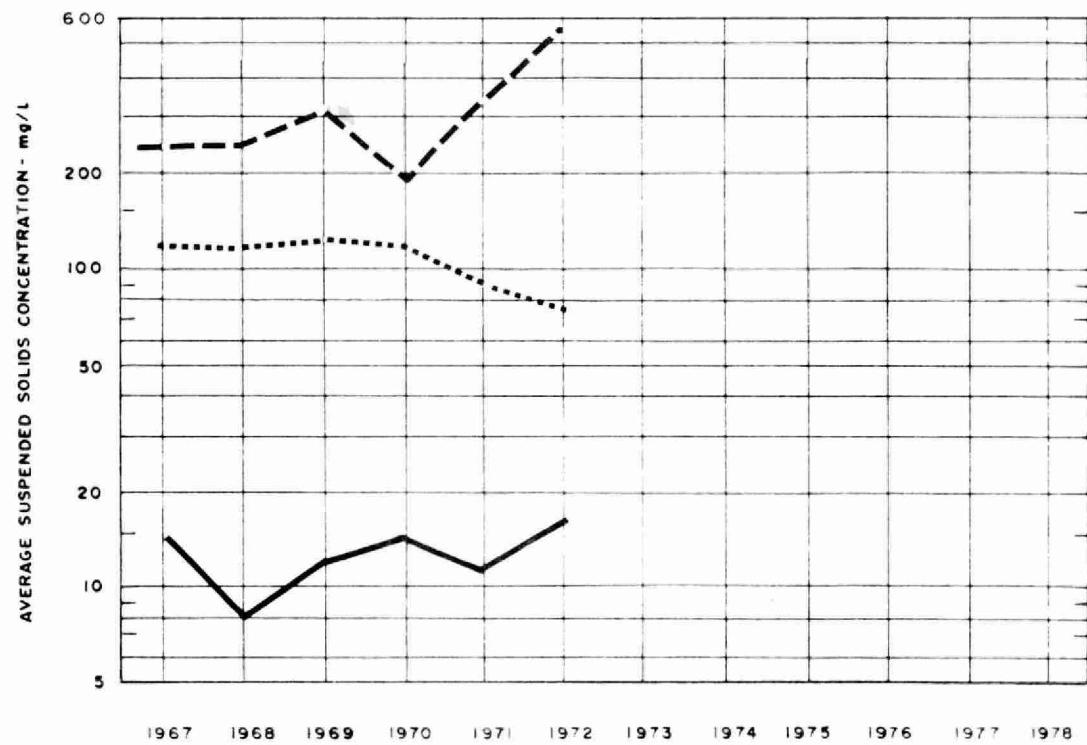
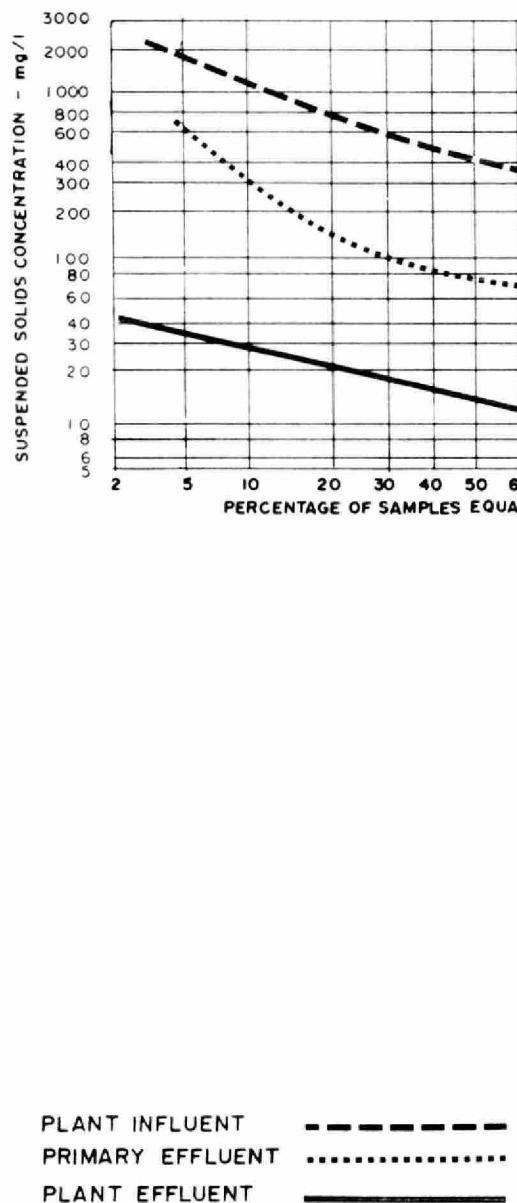
PLANT PERFORMANCE

MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW million gallons	AVERAGE DAY mil. gal	MAXIMUM DAY mgd	INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l P	EFFLUENT mg/l P
						%	10^5 pounds			%	10^3 pounds		
JAN	49	1.6	2.6	276	12	96	1.3	527	9	98	2.5	11.6	2.6
FEB	42	1.4	1.8	28	19	93	1.1	609	15	98	2.5	16.0	3.0
MAR	73	2.4	7.7	283	19	93	1.9	971	36	96	6.8	14.4	1.9
APR	130	4.3	8.4	135	11	92	1.6	513	15	97	6.5	7.8	1.6
MAY	56	1.8	3.4	146	21	86	.7	295	15	95	1.6	10.6	3.3
JUNE	50	1.7	2.8	158	18	89	.7	284	25	91	1.3	11.8	2.5
JULY	55	1.8	2.3	140	20	86	.7	558	14	97	3.0	12.1	2.3
AUG	54 est.	1.7	1.9	202	19	91	1.0	800	11	99	4.2	15.0	2.2
SEPT	49 est.	1.6	1.9		35				15			2.7	3.6
OCT	54 est.	1.7	2.5		3			323	10	97	1.7		2.9
NOV	60 est.	2.0	3.0		7			454	14	97	2.6		3.1
DEC	57	1.8	7.3	260	14	95	1.4	243	17	93	1.3	14.0	3.3
TOTAL	732 est	-	-	-	-	-		-	-	-		-	-
AVG.	61	2.0	8.4	185	15	92	1.2	552	15	97	3.1	7.5	1.9
No. of Samples	-	-	-	32	63	-	-	111	128	-	-	30	37

BIOCHEMICAL OXYGEN DEMAND

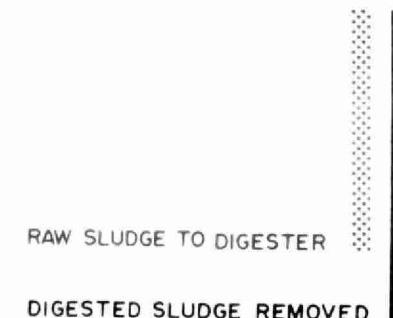
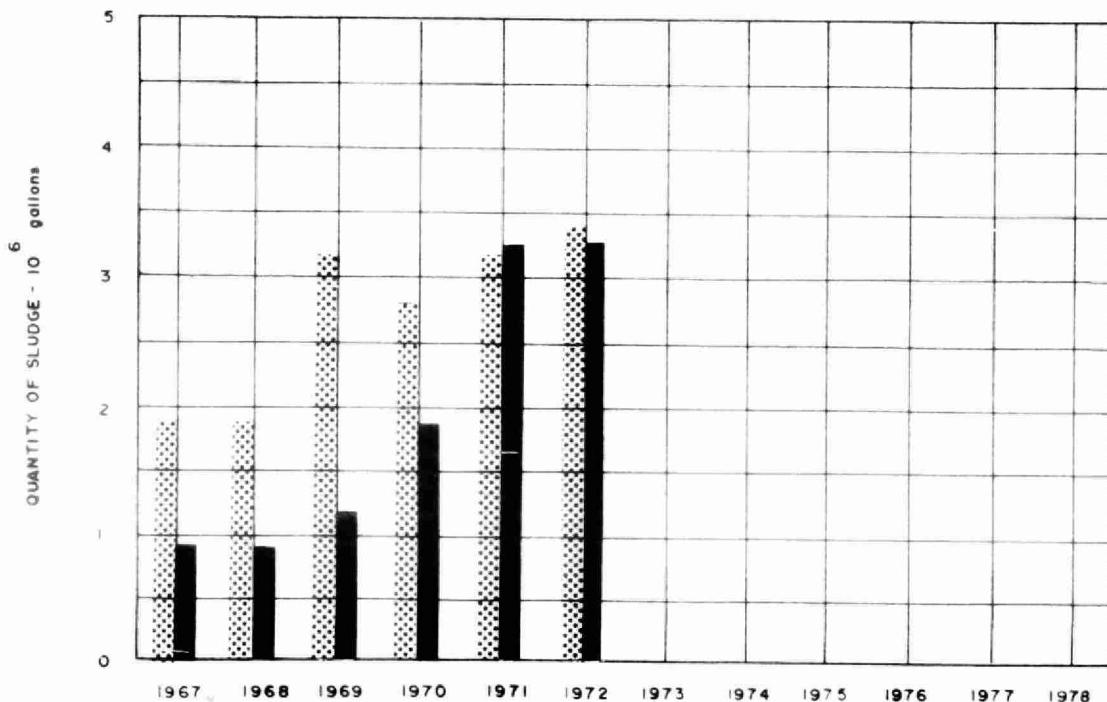
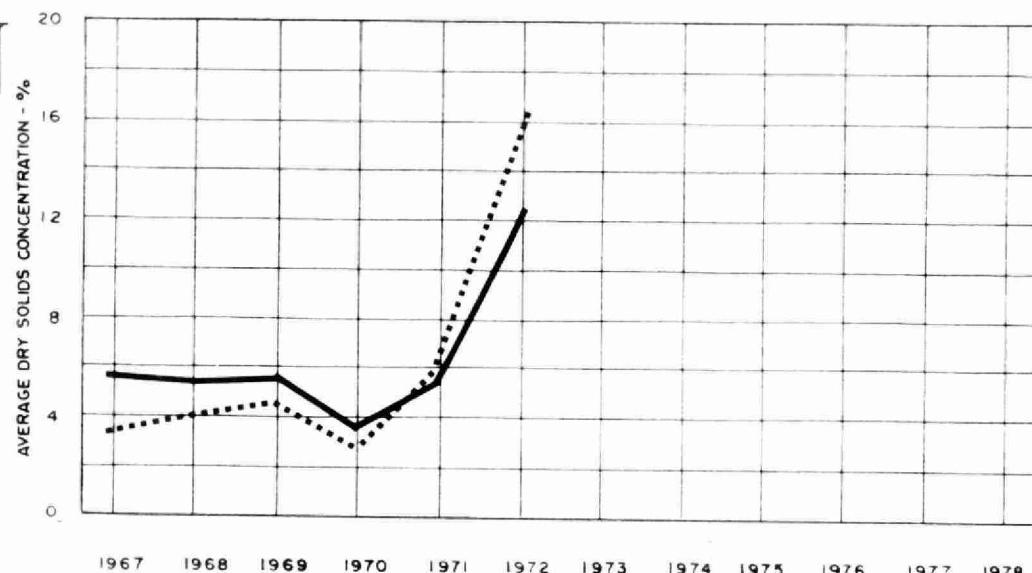


SUSPENDED SOLIDS



DIGESTION

RAW SLUDGE
 DIGESTED SLUDGE ———



TREATMENT DATA

MONTH	GRIT	CHLORINATION		PRIMARY EFFLUENT		AERATION			SLUDGE DIGESTION and DISPOSAL							
		CL ₂ USED 10 ³ pounds	Avg. Dose mg/l	BOD mg/l	SUSPENDED SOLIDS mg/l	MLSS CONC mg/l	F/M day ⁻¹	AIR 1000 ft ³ lb BOD	RAW SLUDGE		DIGESTED SLUDGE		SUPER- NATANT T.S. %	AMOUNT HAULED cubic yards		
	QUANTITY REMOVED cubic feet								QUANTITY 10 ⁵ gallons	TOTAL SOLIDS %	VOL. SOLIDS %	QUANTITY 10 ⁵ gallons	TOTAL SOLIDS %	VOL. SOLIDS %	%	
JAN	79				90	1900			2.4			2.0				1202
FEB	82				114	2000			1.9			2.9				1694
MAR	94			92	76	2000	.22		2.4			2.4				1452
APR	132			53	56	2100	.20		2.3	17.4	41	1.4	9.6			810
MAY	68	2.1	5.0	65	79	1900	.14		2.6			2.2				1309
JUNE	87	2.8	5.6	96	77	1800	.20		2.8			1.8				1088
JULY	112	2.7	4.9	74	80	1400	.21		2.5	14.7	21	3.1	15.0	21		1841
AUG	102	2.6	4.9						2.8			4.8				2826
SEPT	101	2.5	5.0			2100			2.6			3.1				1815
OCT	97	2.4	4.6		23	1700			3.7			3.0				1802
NOV	83				107	1300			3.4			3.5				2092
DEC	111				91	1400			4.6			3.6				1982
TOTAL	1148	15.1	-	-	-	-	-	34.0	-	-	33.8	-	-	-		19913
AVG.	15.7 cu.ft/mil gal	2.5	5.0	76	79	1800	.19	-	2.8	16.1	31	2.8	12.3	21		1659

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